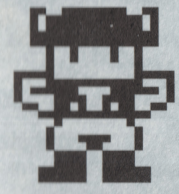
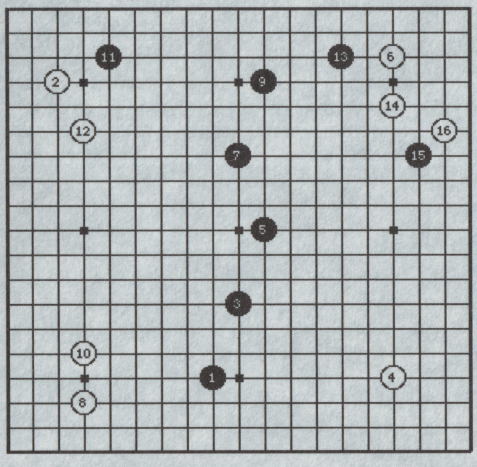
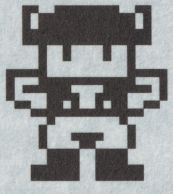
Bruce Wilcox's

Instant Go Starter Kit







The Game of Go

Flavorful Description

Go is an ancient board game that takes the simplest of elements — line and circle, black and white, stone and wood — uses simple rules, and yet generates subtleties of play that have enthralled players for thousands of years.

Go is easy to learn. Its few rules can be demonstrated quickly and grasped easily, and it can be played enjoyably by people with a wide range of skills. Moreover, a unique and reliable handicapping system affords players an enjoyable contest, even between those of greatly differing skill.

Beyond being merely a game, Go takes on other meanings for its devotees: an analogy for life, an intense meditation, a mirror of one's personality, an exercise in abstract reasoning, a mental "workout," or an art form in which black and white dance across the board in delicate balance. Most importantly, Go is challenging and fun for all players. (adapted from American Go Journal)

Origins

Go is among the oldest games, originating in China over 4000 years ago. In the fifth century A.D. the game was carried to Japan where it flourished to such an extent that today Go is Japan's national game. In Japan, there are over 400 professional players who compete in tournaments sponsored by major newspapers and television stations. Go is so well integrated into Japanese society that even women's magazines have Go columns, and major corporations pay professionals to teach at company Go clubs.

Though Go has been played and respected in the Orient for centuries, it was not until 1911 that Dr. Edward Lasker, a famous chess master, brought Go to the United States. While Go is still relatively unknown here, there are Go clubs in many cities and local and national tournaments, as well as two native professional players trained in Japan, and one trained in Korea.

American Go Association

The American Go Association publishes a journal, coordinates a network of clubs throughout the US, sanctions and promotes rated tournaments, distributes a list of clubs and members, and engages in various activities to promote Go. Membership (1990) is $25, write to:

AGA Box 397 Old Chelsea Station NY, NY 10113

Handicaps & Ratings

One advantage Go has over other strategic games is its handicapping method. Since Go involves successively adding stones to the board, the weaker player takes Black and starts with extra initial moves. The wider the disparity of strength between the players, the greater the number of handicap stones Black is given. The handicap between the strongest and weakest players in the world, if given, would be about 45 stones! For those who want to compare the complexity of Go with that of chess, the difference between strongest and weakest players in chess is only 26 stones (measured using an equivalent rating system).

The rating system is tied to handicapping, with one rank difference equal to one handicap stone. A beginner who has just learned the rules is rated at 35 kyu (class). As he gets stronger, he works his way to 1 kyu. Since each level corresponds to a handicap stone, a 30 kyu player takes a 7 stone handicap from a 23 kyu player. After 1 kyu, ratings are measured in dan (black belt rank), with higher dan numbers signifying a stronger rating. A five (5) dan would give nine (9) stones to a five (5) kyu. The top US amateurs are seven (7) dan. Professional players are even stronger.

Black's first move consists of placing his handicap stones. Evenly matched players should set Black's handicap to **No handicap** and either alternate sides in a series of games or give White four to eight (4-8) points per game to compensate for the disadvantage of starting second. One (1) stone handicap is the same as a **No handicap** where the weaker player always takes **Black**, and **White** receives no compensation.

Under **Japanese** rules, NEMESIS places the handicap stones according to fixed positions. These stones will remain on the board even when the board is cleared.

In contrast, **Chinese** rules allow **Black** to place handicap stones anywhere. Since the placement of these stones is **Black's** choice, the handicap stones do not stay on the board when cleared.

Table of Contents

How to Play Go

Board: Go is played with black and white stones on a grid, usually of 19x19 lines. The figure on page 5 shows a 13x13 board.

Moves: Players alternately place black and white stones on the grid's intersections. Black always goes first. Each player places one stone per turn. She can place his stone on any vacant intersection, including along the edge and in the corners. A player may pass instead of placing a stone if she finds no move of value. The game ends when both players pass in succession.

Objective: Players attempt to surround regions of empty intersections with walls of their stones. The player who has surrounded the most empty intersections at the end of the game wins.

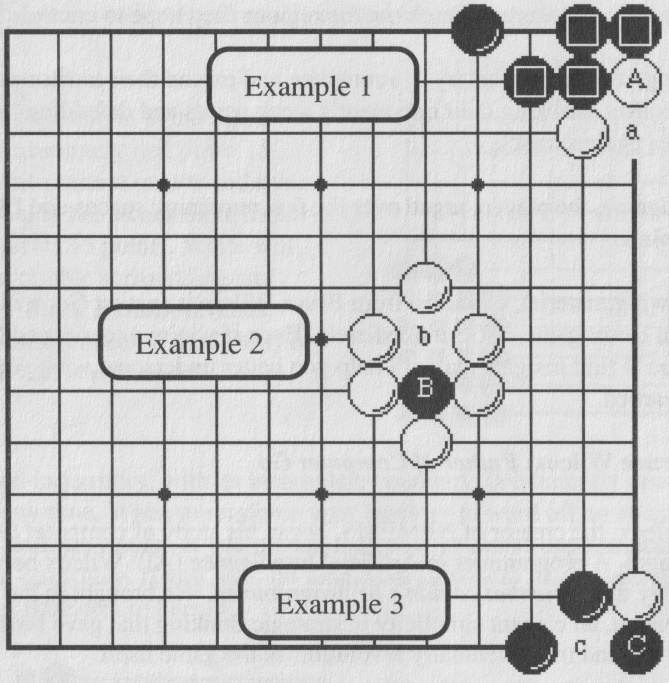
Strings: Stones of the same color that are immediately adjacent along the horizontal and vertical lines of the grid form a string. A single isolated stone is the smallest string. Two single stones diagonal to each other are not part of the same string. Strings are the fundamental units of capture. In the figure on page 5 there are six black strings. (Stones marked with a square form one string, while all other black stones are single-stone strings.)

Liberties: Vacant intersections horizontally or vertically adjacent to a string are called liberties (diagonals don't count). In example 1 in the figure on page 5, there are two black strings each having 3 liberties. (Can you find them?) The black string B, in example 2, has one liberty, marked with the letter b.

Capture: A string is captured (removed from the board) when all its liberties are filled in by stones of the opposite color. Any of your stones your opponent has captured are added to his score and visa versa. On page 5 in example 3, White's single stone string has one liberty, its other two adjacent intersections are occupied by Black stones. If Black filled in the last liberty, he would capture White's stone.

Suicide: A player may not commit suicide by playing a stone at an intersection such that its string has no liberties. A Black play at b in example 2 on page 5 would be suicide. However, such a play is not suicide and is permitted if it creates liberties by simultaneously capturing enemy stones. I.e., White may play c in example 3 since that captures Black's stone C.

Repetition: Repeating a board configuration is illegal. This means that the entire board cannot look the same as it did on any prior turn. Because you are adding stones on each turn, this only happens under special kinds of capture situations. Unlike chess, which ends in a draw if the board repeats often enough, Go requires that you not repeat.



Example 1: White's stone A can be captured by a Black stone played at a. A White stone at a would save White A by creating a 3-stone string with 3 liberties.

Example 2: White's play at b captures Black's stone B. Black cannot play at b, since it would be suicide for both Black stones.

Example 3: This is a ko, a situation involing the potentially infinite capture of each other's stones. If White captures Black at c, Black could respond by capturing White's move, and so on, ad infinitum. This repetition is not permitted because the board image would be repeated. If White captures Black, Black must play elsewhere before he can respond to the ko by capturing White's stone. Playing elsewhere changes the board image so that no repetition occurs.

How to Play Better Go

Introduction

Most Go games have three phases: the opening, the midgame, and the endgame.

In the opening, the players sketch out the regions they hope to control.

In the midgame, the players try to strengthen and extend their territories, while simultaneously attacking their opponent's weak points and defending themselves against attack.

In the endgame, the players argue over the few remaining spaces and fill in the neutral points.

The following material, extracted from Bruce Wilcox's *Instant Go*, will help you play a better game of Go immediately. Even if you're experienced Go player, you'll find insights that will help you better understand what you have already learned.

About Bruce Wilcox: *Father of Computer Go*

Bruce Wilcox, the creator of NEMESIS, began his study of computer Go almost 20 years ago. A programmer in Artificial Intelligence (AI), Wilcox became intrigued by the *game that couldn't be programmed.* He brought to the game an unusual vision, an elegant simplicity in strategic thinking that gave birth to computer Go and may eventually revolutionize the game itself.

Using his own techniques, Bruce has become a 6 Dan, one of the top rated players in the U.S. He has devoted his life to making a program that can play at a professional level and has already made inroads into AI theory. Bruce lectures widely on his theories in the U.S., Europe, and Asia. A best-selling book on the history of Go, published in 1986 in Japan, devoted one chapter largely to his landmark programs. A complete book on his unique Instant Go theory is expected to release this century.

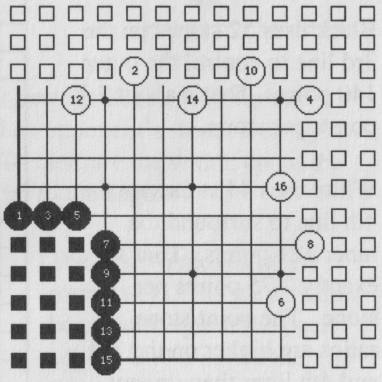
Special thanks to William Sommerwerck for his editing assistance. Also thanks to Kian Wilcox (age 6) for the cover figures. The opening game depicted on the cover is an example of *The Great Wall Opening*, by Bruce Wilcox.

Opening: Laying the Foundations

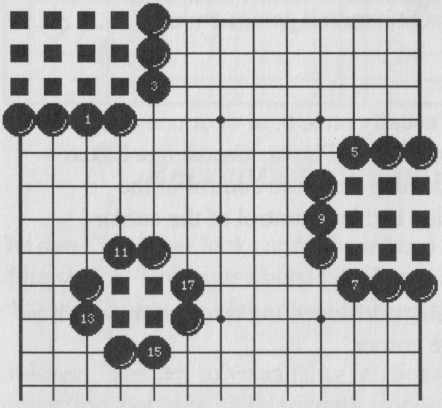
In the game's opening, players stake their claims to empty regions on the board.

Sketching: A novice might begin by placing her stones in a line to build a wall, then build successive walls to enclose territory. This is a sure way to lose. Instead, distribute your stones broadly at first, then link them later (sketching.)

In the 13x13 example to the right, Black has absolutely tied down 15 points. White cannot invade and live. But by placing her stones more loosely, White controls 65 points. White will have little trouble surrounding and cutting off Black if Black invades. Even if Black reduces White's territory by half, White is still ahead.



A sketched-in territory, with its incomplete boundary, is inherently open to attack at any time. When to reinforce your territory to ward off an attack is a matter of delicate timing. If you defend too soon, you miss opportunities for expansion elsewhere. If you wait too long, your opponent might destroy your position at little cost to herself.



The Edge: The board edge automatically forms a boundary for an adjacent territory. The edge lets you sketch a larger territory with fewer stones.

In the example to the left, a 12-point corner is sketched in 2 moves and completed in 7. A 9-point side is sketched in 3 moves and completed in 9. A 4-point center is sketched in 4 moves and completed in 8.

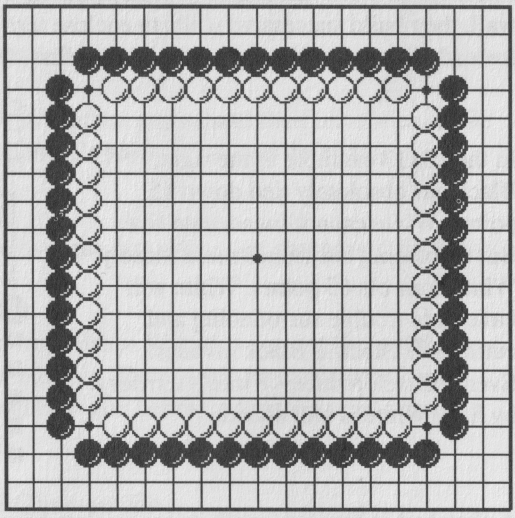
Corner territory creates the most area for the least investment of stones, which is why players almost always make their first moves in the corners.

3rd and 4th Lines: To take advantage of the edge, you should begin sketching in the corners, then expand to the sides. But where should you play? It turns out that the 3rd and 4th lines from the edge represent the most efficient play.

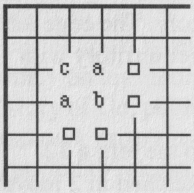
The diagram to the right suggests why this is so.

Black uses 52 stones on the 3rd line to control the outer 140 points. That's about 2.7 points per stone.

White uses 44 stones on the 4th line to surround the inner 121 points. That's exactly 2.75 points per stone. The point/stone ratios are higher on the 3rd and 4th lines than on any other.



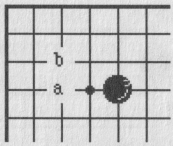
Corner Moves (Joseki): Go, like chess, has evolved a large number of standard opening sequences that start both players off on roughly equal footing. These moves are called joseki. You don't have to master any joseki right now; the following approach will work for your next hundred games or so:

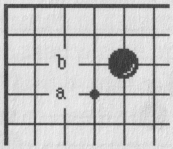


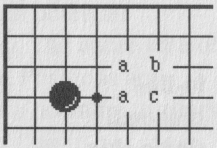
Opening play is usually on a, b, or c, or one of the highlighted intersections. Players choosing a boxed intersection are aiming for more control of the corresponding side and less control of the corner.

With an opening move on a symmetrically positioned intersection (b or c) it is not urgent to further attack or defend the corner.

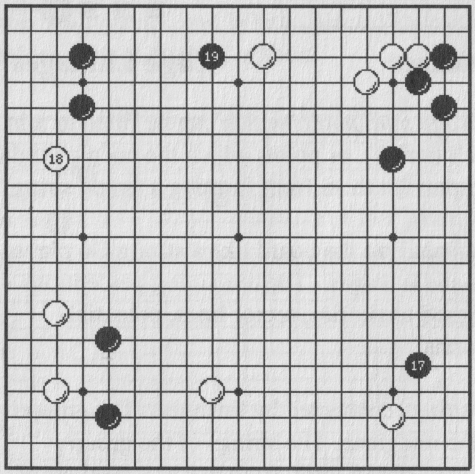
If your first corner move is not on a symmetrically positioned intersection (not on b or c), your opponent will usually quickly respond. In the drawings below, either player would like to take one of the indicated points, usually in the order shown.







Extending along the Edge: When sketching along the edges, look for the widest unclaimed area between your stone and an opponent's stone. Don't play in this area unless it is at least 3 points wide. (To measure the width, count the lines between the stones which are perpendicular to the edge.)



The first 16 moves at left were joseki. The players then began staking out the open edges. B17 claimed the largest open edge (9 lines wide prior to B17). W18 took the next largest (7 lines). B19 took the remaining edge (6 lines). All remaining edge areas are now less than 3 lines wide.

These 19 stones complete the opening. All corners and big edge areas have been claimed.

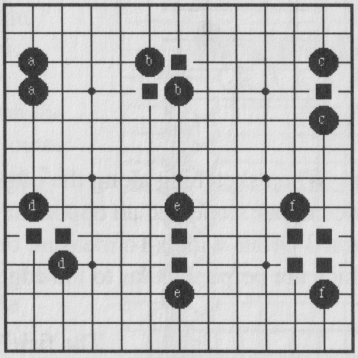
Perception: Visualizing The Board

The non-Go player looks at the board and sees only vague patterns of black and white stones. The experienced Go player sees the strategic and tactical relationships among both stones and empty intersections. Here is what they see.

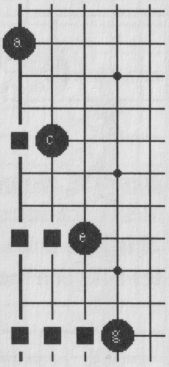
Linkage: The key to visualizing relationships is linkages. A linkage is a connection between close friendly stones (stone linkage) or a stone and an edge (edge linkage). The stones forming the linkage are called endpoints. (The endpoints may or may not be part of a longer string.) Edge linkages have only one "real" endpoint; the edge of the board acts as the other endpoint.

Linkages form barriers that opposing stones cannot easily connect across. If two stones (or a stone and the edge) are not related via one of the patterns shown in the diagram below, they do not form a linkage. They are too-widely separated and thus their barrier is easily breached. Short linkages are stronger than longer ones. The linkages, from shortest to longest, are:

a in-line
b diagonal
c single-skip
d small knight
e double-skip
f large knight
g triple-skip



Stone Linkages



Edge Linkages

The bold-boxed intersections are *linkage path points* which can be filled to join the linkage endpoints into a solid wall (string), or points which the enemy might occupy to disconnect your stones, to prevent them from forming a single string.

Now that you know linkages, you can analyze the board like a strong Go player. You have been introduced to strings and linkages. The remaining perceptions you need to master are: groups, enclosed territories, sector lines, potential territories, positions, and neutral regions.

Group: A group is a collection of strings connected by linkages. The group is the fundamental unit of analysis in the midgame. The strings of the group engage in a cooperative defenseand may bound territory to use as a resevoir of protected liberties. If the joint defense fails, the whole group is said to be dead. Eventually all strings of a dead group can be captured. The ability to recognize a group as alive or dead is essential.

Enclosed Territory: An enclosed territory is a contiguous blob of empty points surrounded on all adjacent horizontal and vertical intersections by one player's group. At the end of the game, whoever has more enclosed vacant points wins.

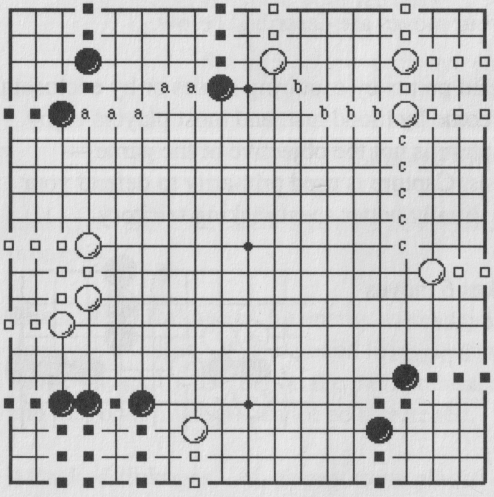
Sector Line: A linkage is a barrier formed by close-range stones. A sector line is a potential barrier formed by an imaginary line between more distant stones of one color, providing this line is not broken (crossed) by any other stones or linkages. Sector lines are the key to analyzing attack and defense in the midgame. They disappear by the endgame (because everything is too close.)

Potential Territory: A potential territory is a contiguous blob of empty points between one player's adjacent groups. Unlike an enclosed territory, a potential territory is not completely bound by linkages; instead, sector lines between the groups form the remaining boundaries.

Position: A position is a collection of contiguous groups and potential territories of one color with no intervening opponent groups. The entire area of a position appears to be controlled by either Black or White. Positions are opening and midgame perceptions involving groups and their potential territory, which degenerate by the endgame into single groups.

Neutral Region: The neutral region is the set of empty points not covered by any of the above. Like the name implies, neither player has any claim over these vacant intersections.

Example perceptions are shown below. The (#/#) after each definition shows how many Black and White (Black/White) units of that type are on the board below. Try to find all of them.



String: adjacent stones (7/8)
Linkages: short-range connections and barriers (12/12)
Groups: linked strings (4/5)
Enclosed territories: vacant intersections bounded by a single group (3/2)
Sector Lines: potential barriers (12/20)
Potential Territories: vacant intersections bounded by groups and sector lines (1/2)
Positions: contiguous groups and territories (3/3)

All linkage path points above are shown in boxes. Important sector lines bounding potential territories are shown as letters. In this example, the neutral region is the center of the board and space between opposing stones along the edges of the board.

Each player strives to protect his own positions, restrict or destroy enemy positions, and carve out more territory from the neutral region.

Midgame: Attack and Defense

"The battle is joined" in the midgame. Both players have to strengthen or expand their positions, create new territories, attack their opponent's positions, and defend against attacks — all at the same time!

The midgame normally begins when all opening moves are exhausted (all corner and edge areas are claimed). However, if a player concludes she is falling behind during the opening, she must declare war. She must invade the enemy's open areas before they become secure. Thus the midgame can start even before the opening is complete.

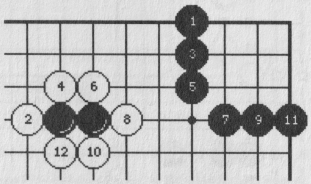
Midgame Strategy

At each turn in the midgame you must decide whether to strengthen your own positions or attack your opponent's. If your opponent attacks vigorously you may have no choice but to defend yourself, but for most midgame moves you may choose between attacking enemy positions and enhancing your own.

Some general principles to guide your moves are described below.

Capture vs Territory: You can gain points by capturing stones or by enclosing territory. Beginners are often overcome by blood lust, and most players enjoy the thrill of the hunt. However, capture is not the objective of the game — surrounding the most intersections is. Capture is used primarily to defend your claims. Your capturing moves are usually better spent making territory.

In the figure to the right, Black takes 6 moves to make 9 points of territory. White takes 6 moves to make 4 points by capture (2 points of territory and 2 prisoners).



Principles of Defense:

The tactical rule is: *Defend linkages.*

Otherwise the positionss you have carefully built in the opening will disintegrate under your opponent's attack.

The strategic rule is: *Avoid enclosure.*

Otherwise your groups run a high risk of being captured, and your other positions are implicitly weakened, because they have one less group to connect to.

Principles of Offense:

The tactical rule is: *Attack from a safe base.*

Keep yourself linked to an existing group to ward off counterattack and to minimize the number of groups you have to defend.

The strategic rule is: *Keep your opponent divided.*

The more groups she has, the harder it is for her to manage them simultaneously.

Multi-purpose moves: The wealth of ideas to be carried out in the midgame is enormous, and you only get one move per turn.

A move that works toward only one goal is a wasted move.

Whenever possible, a move should do *two* or more of the following:

1. Defend your groups
2. Attack her groups
3. Enhance your territory
4. Reduce her territory
5. Set up a follow-up move enabling one of the above.

Linkage Tactics

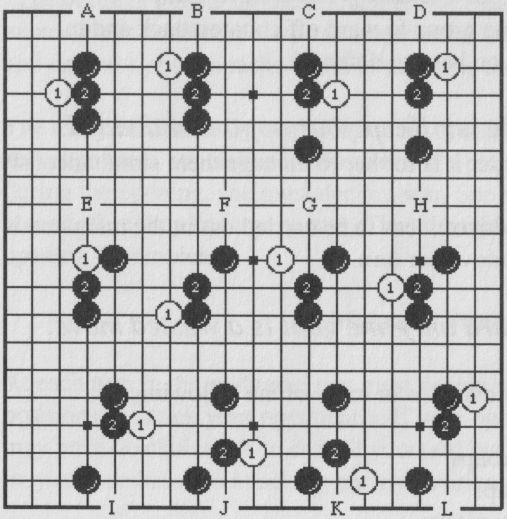
Linkages can be threatened or attacked. Threats and attacks must be answered promptly.

Threatened linkages: An enemy stone adjacent or diagonal to a path point threatens a linkage. A threatened linkage must be immediately secured from further attack by playing on the path point closest to the enemy stone. In-line and diagonal linkages cannot be threatened.

Attacked linkages: An enemy stone placed directly on a path point attacks a linkage. Always defend the linkage even if you cannot reconnect the endpoints. This will help you attack your opponent's stones later.

The move defending an attacked linkage attempts to go around the opponent's stone to rejoin the endpoints. This move creates two shorter linkages, one from each endpoint to the defending stone. These will become the focus of further attack if your opponent is insistent about separating your stones.

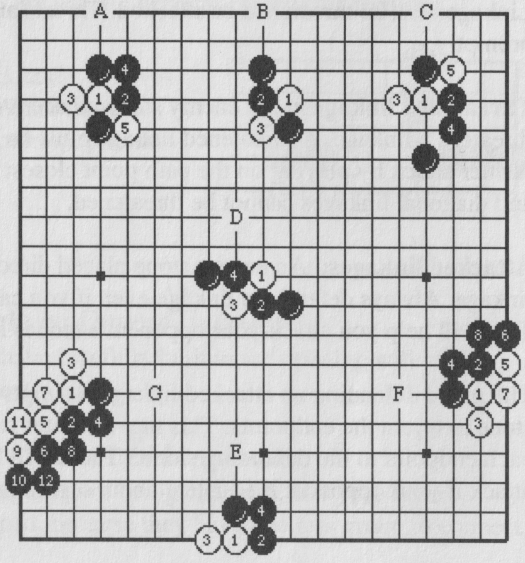
Below are threats against stone linkages (W1) and correct defenses (B2). Edge linkages are handled in the same fashion as A through D below.



In response to White's W1 threats, which are always adjacent or diagonal to a linkage path point, Black responds with B2 on the threatened path point.

The diagram below shows White attacks (W1) against Black linkages and correct Black responses (B2). Each response forms two shorter linkages which become the focus of continued attack and defense. Your opponent can break many linkages when she attacks. Even so, a broken linkage remains a barrier preventing the enemy stones from connecting.

In response to White's W1 attacks , which are always on a linkage path point, Black responds with B2, attempting to rejoin the endpoints by linking around the attacking stone.



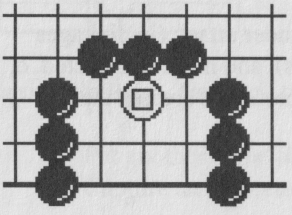
String Tactics

Strings are the fundamental unit of capture.

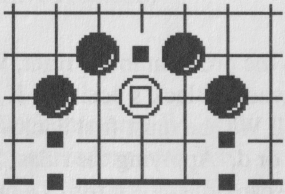
String Capture: There are two steps in capturing strings:

1. Enclose the target
2. Fill its liberties

1. Enclosing the Target: To enclose stones you must build a wall around them. Otherwise, they can expand (add stones to gain liberties) and become harder to kill. The stones in the enclosing wall must be joined by linkages.

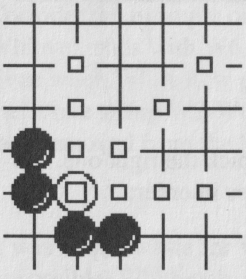


Solid walls (in-line linkages) are inefficient. The enemy won't wait for you to complete the wall, and will easily escape. You can complete enclosure more quickly and with the same effect using other linkages.

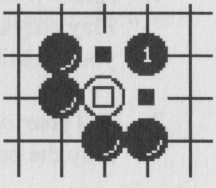


Once a wall is created (see figure at righ)t, if White tries to escape by attacking the linkages, Black simply defends them to keep her enclosed.

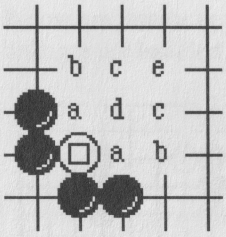
To enclose stones, locate where they have open access to the rest of the board, then make a move which creates two linkages closing off the open access. An enclosing move always creates *at least* two linkages, and always results in the target becoming surrounded by a continuous ring of stones, path points, and possibly the edge.



In the example to the left, White's stone can expand in the directions shown in white boxes.



If Black plays at B1 (shown at the left), he creates two single-skip linkages in order to contain White's stone. White is now enclosed; there is no more open access.



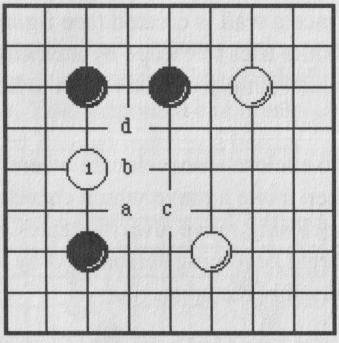
All possible enclosing moves are shown to the left. Symmetrically equivalent moves have the same letter.

To select among the possible choices, apply the following rules in order:

1. Discard moves creating linkages under attack (threatened ones are ok.)
2. Among the remaining linkages, select only the shortest pairs.
3. If you still have to choose, pick the move with the most liberties.

In the diagram above, a and b form linkages already under attack (ie, linkages which have an enemy stone on one of their path points), and must be rejected. c, d, and e are acceptable. Though c and e have more liberties, d creates the shortest linkage pairs and is therefore best.

In the problem to the right, W1 has just invaded Black's position. If Black wants to kill W1, he must first enclose it with a, b, c, or d. Applying the rules: 1. d is discarded, since it forms a large-knight linkage already under attack. 2. c is discarded, since a and b produce shorter linkages. 3. a and b are similar (though a has one shorter diagonal linkage it also has one longer large-knight's linkage; b has two small-knight linkages). a is correct, since it creates more liberties than b.



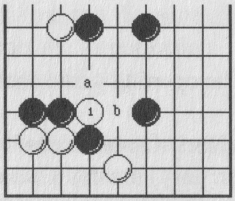
2. Filling Liberties

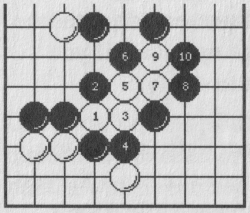
You can only fill one liberty per turn, so it's important to pick the right one. To select among the possible choices, apply the following rules in order:

1. *Attack from a safe base*
   Play only liberty-filling moves that are adjacent to or diagonal from your existing stones.

2. *Fill your opponent's best liberty first*
   Play the one that would gain him the most liberties if he played there.

In the diagram to the right, W1 is already enclosed, with liberties at a & b. If Black played at either a or b he would be attacking from a safe base. The best liberty is a. If White played there her stones would have 4 liberties. If White played at b, she would have only 3 liberties. Black should play at a.

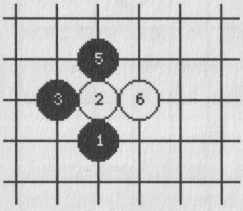




If Black applies the liberty-filling rules at each move, he will succeed in capturing W1 as shown in the diagram to the left.

Saving Strings: There are two way to save strings threatened with capture:

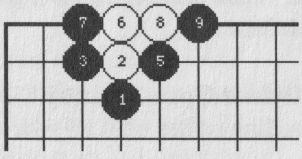
1. Put another stone adjacent to the string to be saved (extend)
2. Capture an adjacent stone



In the diagram to the left, Black threatens W2 with B5. White saves her stone by extending with W6. Black now has to fill three more liberties in order to capture White.

Extending usually doesn't help when you're already enclosed.

Consider the example on your right. When White extends with W6, Black persists with B7. Even when White now plays at W8, Black kills the White string W2-W6-W8. W2-W6-W8 are then removed from the board.



It was a total waste for White to play at W6 and W8, since escape was impossible. White only increased her loss. White should have played elsewhere.

Open Area Tactics

The opening game sketching process creates open areas.

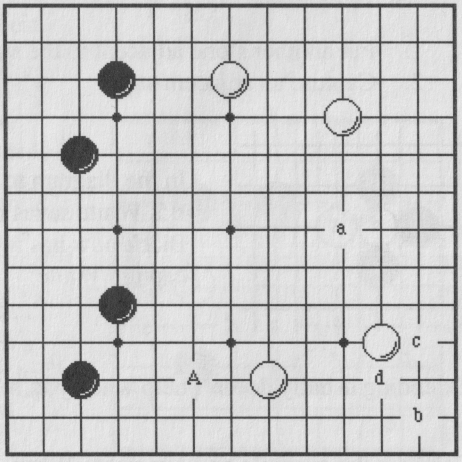
Attack Open Areas by Invading: Invading (placing a stone in the enemy's territory) creates a weak group that is easily attacked. Weak groups will eat up most of your plays defending them — plays that could have been used to create or extend territory elsewhere. Invasions should therefore be reserved for those times you're losing and have no alternative. Choose a large open area if you must invade. You'll have room to make life locally or run to safety.

If there is no large open area, draw the enemy into a contact fight (a fight in which rival stones touch). Contact localizes the fight to a few stones — the rest of the stones dominating the open area do not contribute to the battle. Don't hesitate to sacrifice a few worthless stones so that others can live.

In the figure to the right, White's claims are twice Black's (70 to 35). It would be foolish for Black to continue the opening with A, since he is losing.

Black should invade the open area near a. Invading at b is a mistake; the area is not open. If Black must invade near here, he should engage in a contact fight at c or d.

If White plays first, a is a good defense.



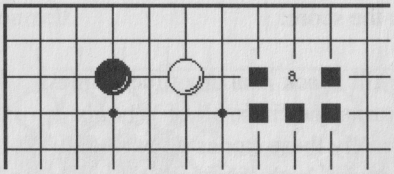
Defend Open Areas by Linking Up: Defense of open areas is easy. Just keep adding stones until all your strings are linked up. Then secure all your linkages.

Group Tactics

The attack and defense of groups is the single most important topic in Go. *Most games will be won or lost by how you handle groups in the midgame.*

Attack Groups by Squeezing: Rarely can you kill what you attack. Even so, attacking is the key to victory. Unlike defensive moves, attacks can — and should — combine a threat with a territorial move. Never just attack.

Begin attacks with an edge squeeze play (on the 3rd or 4th line at a distance of 2 to 4 lines away from your opponent's stones). This prevents the target from immediately securing life-giving territory by extending along the edge.

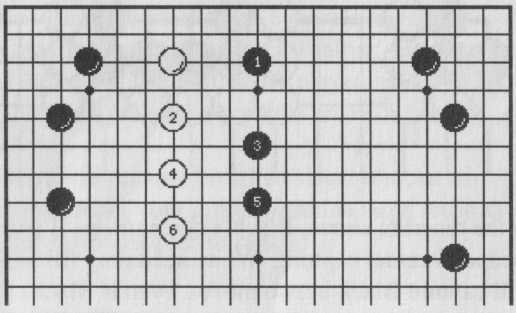


In the diagram to the left, Black should make an edge squeeze play at a (the default) or on a boxed intersection. This keeps White from extending along the edge to gain territory.

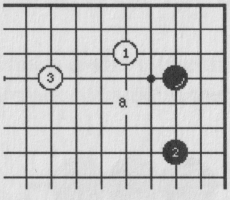
Once you've kept your opponent from easy life, continue squeezing by threatening to enclose her. Continued squeezing forces her to run, while you build a wall to enclose territory. If she fails to run, enclose her.

Black squeezes at the edge with B1, then continues to threaten enclosure. Black is building a large potential territory while attacking!

Note how after B1, all attacking moves are linked to preceding stones (safe base.)

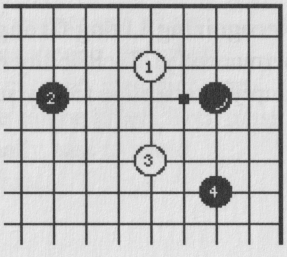


Defending Groups by Extending: A group under attack is such a severe liability that preventing an attack is a high priority. The easiest defense is to extend along the edge to gain territory. This is so valuable that players often suspend their initial sketching to do this. Another defense is to extend towards the center (running). Use this technique if you can't expand along the edge.



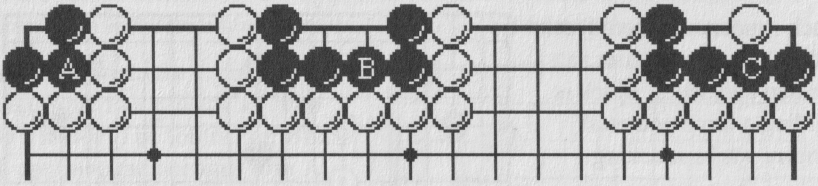
In the figure at left, White squeezes Black's corner with W1. Not wanting to be squeezed again, Black extends along the edge with B2. Then White does likewise with W3, warding off a serious squeeze attack.

In the figure at right, instead of defending when W1 squeezed, Black went on the attack himself. B2 is an edge squeeze against W1. White could only extend into the center (W2). This threatened Black's corner, so he extended with B3. Which of these two diagrams is better for Black depends upon the rest of the board.



Recognizing Dead Groups: Stones without liberties are removed from the board immediately. Stones with liberties can be either alive or dead. Dead stones are hostages on the board. They can be captured at anytime. At the end of the game, dead stones are captured (removed as prisoners) without actually filling in their liberties and they are added to the score.

In the diagram below left, White can play to kill Black A at any time. Unless White is foolish (allowing Black to take six turns and fill in all of White's liberties), Black's position is hopeless. Normally these stones will remain uncaptured until the end of the game. At that time, both sides will acknowledge that Black's stones cannot avoid capture, and White will take them prisoner. This is death. The body remains on the board until Judgement hour, hoping vainly for resurrection. Be aware, however, that sometimes hostages are freed.



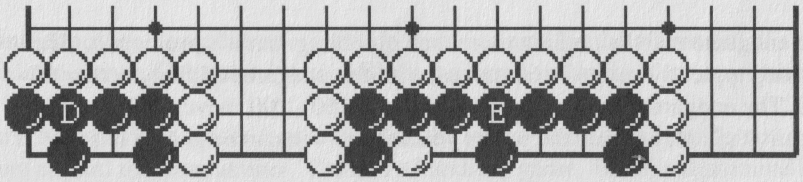
In the diagram above, Black's other strings B and C are also dead. They cannot escape eventual capture. White need only fill in Black's liberties. In B, White will capture Black in two moves, even if Black captures White's first move. In C, White will capture Black in two or three moves depending on whether Black tries to capture White's first move. (Try it if you are not sure)

The essentials of making groups die are covered in detail in the appendix on Killing Groups, which consists of explaining the following poem:

Split him, eat him, make him fill.
Those are all the ways to kill.
Stunt his growth and keep him in,
Never let him join to kin.
Master dead shapes, and the rules,
Then you'll have your basic tools.

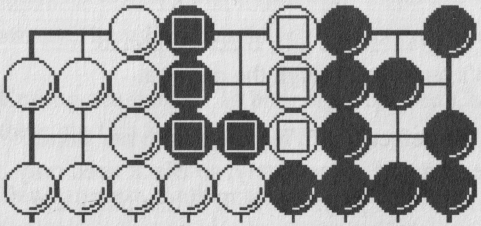
Recognizing Living Groups: Life is the ability of stones to avoid capture permanently. Such ability rests on being able to secure two eyes. An eye is an empty intersection totally surrounded by your stones.

In the diagram below, we see Black stones with two eyes. For White to kill Black D, White would have to fill in each eye. But as soon as White occupies one of them, her stone is removed because it has no liberties and does not capture anything. *Never, ever, place stones inside your eyes.* You will kill yourself.



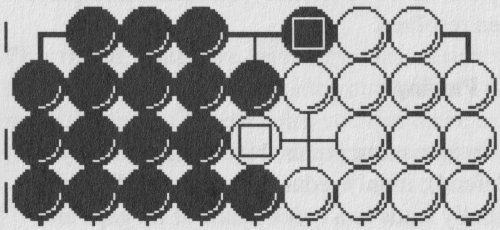
Two-eyed groups are alive. More generally, groups with two separated territories are alive, because they can be filled in to create two eyes. In diagram E above, Black's group cannot be killed. No matter how White attacks, she cannot fill in all of Black's liberties. Black can make two eyes whenever he wishes. Since he cannot be prevented from doing so, Black is alive. He never actually has to make the eyes. At the end of the game, both players will agree he cannot be killed, so his string lives and the territory points are his.

Generally, your groups with two territories cannot be killed since you can add stones to each territory to form an eye. Also, your group with one large territory is usually alive, since you can divide it into two territories.



Here is an unusual example where two opposing groups live, and neither has eyes. Neither player can attack on either liberty of the marked stones without also making it possible for her opponent to kill her stones.

This is a seki (stalemate). The two shared liberties belong to neither player, and are not counted in the final score.



On the left is another unusual form of eyeless life, a double ko. Whenever one player captures a stone, the other player captures the other stone. No one can be killed. Both must eventually pass to avoid repetition.

Endgame: Last-Minute Quibbling

The battles of the midgame are eventually resolved — all areas are well-defined and all groups are alive or dead. The final phase finds the players haggling over boundary placement until no profitable moves are left.

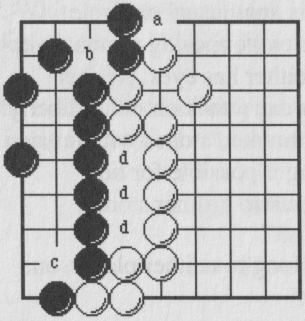
The endgame may be nothing more than quibbling, but it's prolonged. The opening typically lasts 40 - 60 moves, with the midgame adding another 60 - 100. The endgame drags on for an additional 150 - 200 moves, and you must remain vigilant, because the points you need to win can be gained or lost.

During the endgame, territories must be secured against two weaknesses: gaps and defects. Then, both players should occupy any remaining neutral points. (This does not affect the score.) Finally, each player passes.

Gaps and Defects

A gap is a vacant linkage boundary path point. Your enemy can march through a gap, destroying territory.

A defect is a point where two boundary stones are only joined diagonally. Your enemy can play on the defect to keep the stones from joining, and might capture one of them. If a defect is threatened, you must play to secure it.



In the diagram to the left, Black can break into White's territory through the gap at a.

b & c are defects. If White plays at b her stone can be captured immediately, so Black need only defend if White plays there. If White plays at c, White can kill the Black stone below her with one more move; Black is powerless to stop her. c is a dangerous defect, which Black should play first.

The three d points are neutral. They can never be territory, and should be played only when all other points have been resolved.

Passing

Players pass when they see no way to gain more points. Never play inside your own territory (except to attack or defend); it only reduces your score. Playing within your opponent's territory usually leads to a quick death. If all gaps and defects have been taken care of and all the neutral space has been occupied, the only thing left to do is to pass.

Appendix A: Chinese vs Japanese Rules

The rules in Go are so simple; there should be no need for different rules. But... Japanese rules are used everywhere except in China. On the other hand, there are an awful lot of Chinese.

Handicapping: Japanese rules provide fixed patterns for the placement of handicap stones. Chinese rules give Black the first n moves to place anywhere.

Turn Numbering: Under Japanese rules, the stones of the handicap do not count toward the turn number. Thus, in a handicap game, White's first move is considered Turn 1. Under Chinese rules, White passes during Black's handicap moves, so the turn number of White's first stone is twice the number of the handicap. For example, against a 2-stone handicap, White's first move is labeled Turn 4.

Suicide: Japanese rules forbid placing a stone on an intersection with no liberties if it does not capture enemy stones (i. e. suicide). Chinese rules allow suicide of two or more stones. Suicide is not particularly useful.

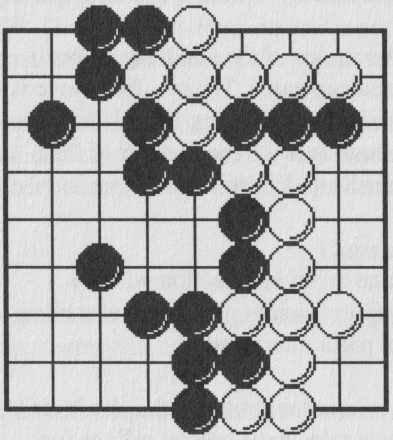
Repetition: Chinese rules use a universal no board repetition rule. A player cannot repeat an entire board image. Japanese rules have special rulings for specific repeated board positions that rarely happen in normal games. In a Japanese professional tournament game this century, a new repetition pattern arose. The ruling was that the game was canceled; a new game was played.

Ending the game: In both Japanese and Chinese rules, the game ends when there are two successive passes.

Dead stones: At the game's end, when both players have passed in succession, stones which both players agree cannot avoid capture are removed and handed over as prisoners. It is not necessary to fill up their remaining liberties when both players are in agreement. These are called dead stones. In Japanese rules these dead stones are added to the score. In Chinese rules they are not. The net effect is the same.

Play inside your own territory: Japanese scoring rules penalize you one point for each move you play inside your territory (since only empty intersections are scored). Under Chinese rules you can make extra defensive moves without cost (other than loss of your turn), since occupied intersections are also scored.

Scoring: Under Japanese rules a player's score is a count of territory (intersections enclosed but not occupied) and of enemy stones captured. Under Chinese rules a player's score is a count of intersections enclosed and occupied. The difference between the players' scores is usually the same, except that it can vary by a point if Black moves last and varies by n - 1 points in the event of an n- stone handicap. Note: under Chinese rules, the sum of both sides scores totals the intersections of the board.



This game has just ended, and White is about to remove 3 dead Black stones (do you see them?). Under Japanese rules, Black surrounds 29 empty intersections, and White 20 with 3 prisoners. Black wins by 6 points. Under Chinese rules, Black surrounds 29 and occupies 15, for a total of 44. White surrounds 20 and occupies 17, for a total of 37. Black wins by 7 points.

Mechanics of Counting: At the end of the game, in either rules, players first remove the dead stones and hand them to their captor. Then:

In Chinese rules, White stones from anywhere off the board are used to fill in White's territory. Similarly this is done for Black's territory. Then each player counts the number of stones they have on the board. The player with more stones wins.

In Japanese rules, each player takes the prisoners she has captured and uses them to fill in the opponent's territory. Then each player counts her empty intersections remaining. Whoever has more wins.

In either case, the score is reported as the margin between the players. E.g., Black wins by 6 points. If White concedes before both pass, Black is said to win by resignation.

Appendix 2: Killing Groups

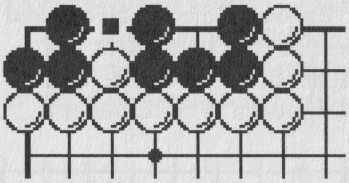
Split him, eat him, make him fill.
Those are all the ways to kill.
Stunt his growth and keep him in,
Never let him join to kin.
Master dead shapes, and the rules,
Then you'll have your basic tools.

Fundamentals of Killing: Killing means preventing the formation of two eyes. While many moves may be involved, the fundamental killing techniques were summarized in the poem above.

Split him. Separate him into two one-eyed groups.
Eat him. Eat away potential eyes by playing adjacent to them
Make him fill. Threaten to capture his strings, thus forcing him to join.
Those are all the ways to kill. But he must not live, so...
Stunt his growth. Don't let him expand and acquire more territory.
Keep him in. Don't let him escape containment.
Never let him join to kin. Don't let him join to other groups of his.
Master dead shapes. Standard killable shapes shortcut complex analyses.
And the rules. Priority rules help you pick the next best move to try.
Then you'll have your basic tools. The rest is just experience and study.

1. Split him

It doesn't matter if he has two eyes so long as they aren't connected to each other.

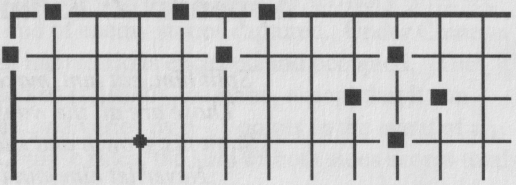


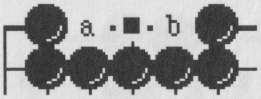
The marked intersection, in the diagram to the left, is the essential point. Black can live and White can kill, depending upon who plays first. This is an easy example. Usually splitting him is not possible.

2. Eat him

To make an eye shape, the defender must occupy all adjacent intersections to the eye. Eating an eye is simple. Play an attacking stone next to the eye. Then that potential eye can never be finished. Instead the defender will have to capture the eating stone, which means filling in the potential eye with a liberty-filling move.

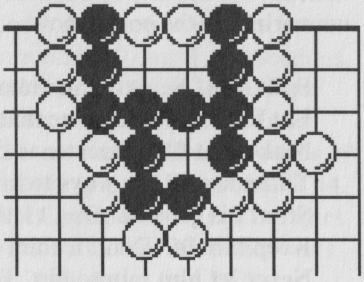
In the diagram at right, the three kinds of eyes (corner, side, center) have their adjacent intersections marked with a black box.





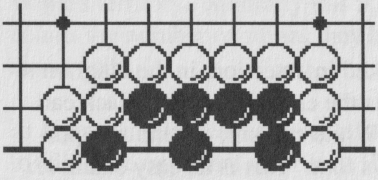
In the diagram at left, if White plays the black boxed intersection, she eats the potential eyes at a and b, leaving her stone as the only possible eye. Black dies.

However, stones don't eat each other. In the diagram at right, White's two stones inside Black eat the other two empty points. But each stone remains a potential eye. Black lives.



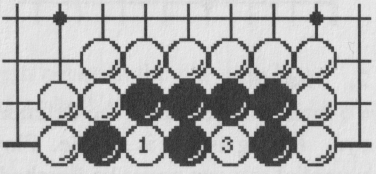
3. Make him fill (False eyes)

Usually territory is not bounded by a solid wall of defender stones. There are often multiple strings bounding the territory. If you can threaten to capture one of them, the defender may be forced to join them together by playing an interior connecting move. This would fill in one point of his own territory.



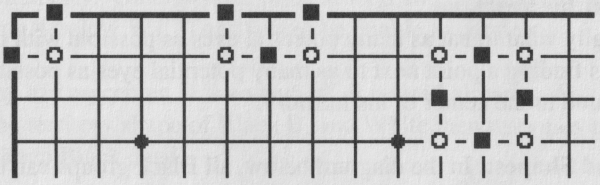
In the diagram at left, Black seems to have two eyes. But one of them is false, based on a connection defect that Black will have to fill in. Black has a stone with only 1 liberty, and if White captures it ...

At right, W1 captures the single Black stone. The false eye disappears, and all of Black's remaining stones are threatened with capture. After W3, Blacks stones are all removed.

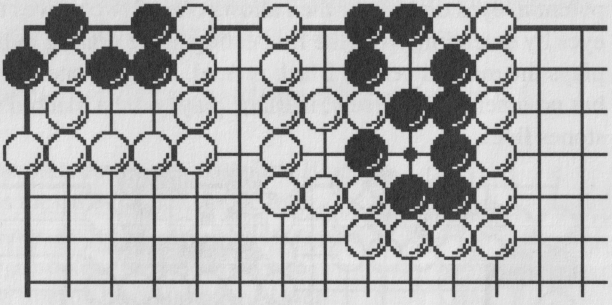


Black cannot stop this by connecting at 1 instead, since he will have filled in his second eye. Black is dead.

An eye requires control over the four adjacent points (black marks in the diagram below). A real eye (not false) requires sufficient control over the four diagonal points (white marks) as well. Control over a point means occupying it, or preventing your opponent from safely occupying it. For an eye on the edge, the defender must control all diagonal point from the eye. For an eye in the center, the defender must control three of four diagonals. Thus, the place for the attacker to play to force the defender to fill in his own eye is not adjacent to an eye, but diagonal from it.



All eyes right are false, and their Black groups dead. White could fill all other liberties and force Black to fill in his false eyes or face capture.



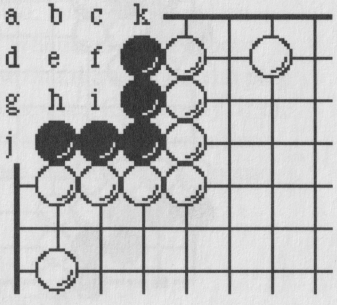
In a nutshell, that's what you need to do to him to kill:

Split him, Eat him, Make him Fill.

And to prevent him from improving his position:

Stunt his growth and Keep him in, Never let him join to kin.

But if that's all you know, solving problems will be an extremely slow process of trial and error. A problem like the diagram to the right has millions of sequences that could be played. While many of them lead to the same position, there are over 100,000 resulting positions to reach.



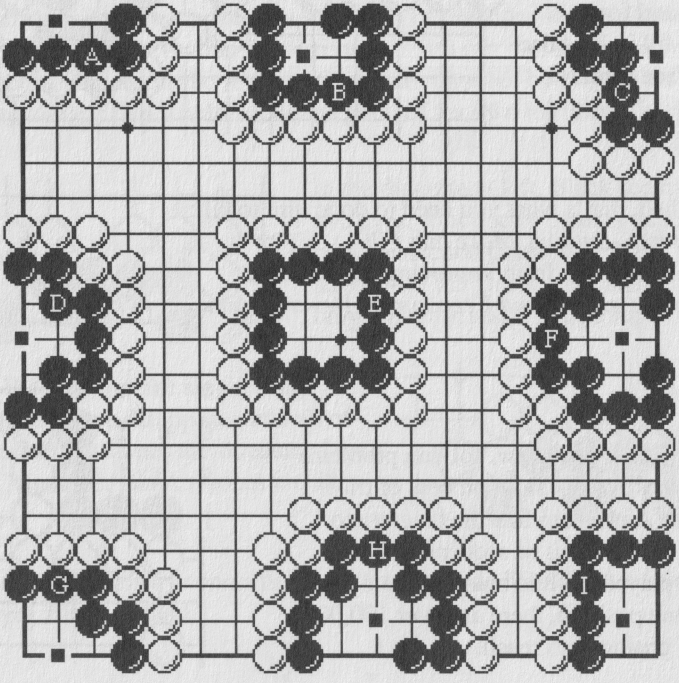
Master Dead Shapes and the Rules

A strong Go player can tell you the result of the previous example in an instant (*The Carpenter's Square is ko*), and he knows the first move is e. That is, he has a knowledge of the results of play against standard named shapes, and he knows priority rules for how to pick among many choices. With priority rules you know which moves to try first. With memorized shapes, you can stop partway through a sequence and know the results of all possible sequences from there. Let's consider a few rules and the basic shapes.

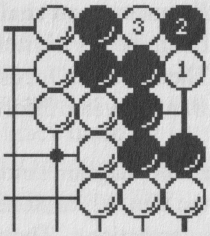
Rule 1: Eat his heart out

You naturally want to eat as many potential eyes as possible with one blow. This means finding a point next to as many potential eyes as possible. Such a place is found in the center of his territory.

The 9 Dead Shapes: In the diagram below, all Black groups can be killed by playing the black mark in the center of Black's territory. It eats away at all other potential eyes directly or then allows one of two moves to eat any remaining eyes by extending from the first eating move (eating indirectly). After White plays the marked center, Black is dead. He gets one eye from the eating move, but no others. Conversely, if Black plays on the marked intersections first, his stones live.



C is unusual. It has two centers. If White plays the marked center with W1 (right), the best Black can do is take the other with B2. But the unique property of the corner makes Black's move have only one liberty, so White captures it with W3. Now all of Black's stones are threatened and he must fight ko to live.

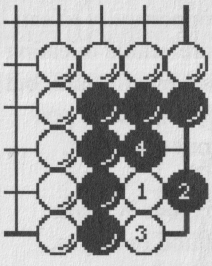


This shape is only dangerous in the corner, and only when Black has no more than one outside liberty. Otherwise he turns around and catches both White stones by playing 4 below W1. They would be unable to connect.

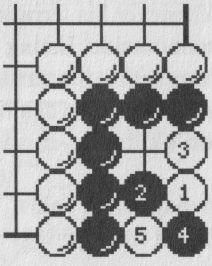
Black's E string has no center. It is so bad off, it is dead already. Any Black move creates the territory shape of Black B, and White then responds on the center point to keep Black dead.

In G & H, once White takes the center, White can expand out from it to eat any remaining potential eyes and cannot be stopped from doing so.

With I, again there are two centers. White could take either of them to kill.



In the diagram at left, after W1, Black takes the other center, and White continue with W3. B4, however, gets only 1 liberty. If Black had one more liberty, he could have played B4 safely. Then White would attack as shown in the diagram at right, getting ko. If Black has two or more outside liberties, there is no kill.

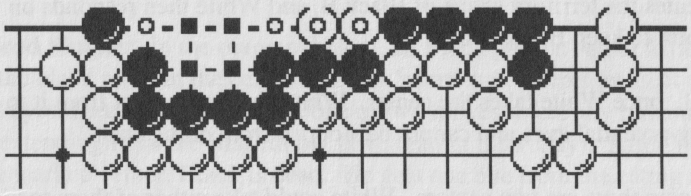


The key to fast analysis of problems is the memorization of the shapes of empty territory (see the diagram on page 28). These are ALL the dead shapes of solidly bounded space. Many other shapes can be killed, but they depend on gaps or defects in the boundary around the territory. Whenever the defender captures stones in one of these dead shapes, you know that the attacker can play back onto the key point, and the result is only worth one eye. Conversely, if the defender captures stones that are not in one of these shapes, he can make two eyes out of the territory he gets from the capture. These shapes must be memorized. The names of the shapes are:

A. Straight 3	D. Pyramid 4	G. Bulky 5
B. Bent 3	E. Block 4	H. Rabbitty 6
C. Bent 4 in Corner	F. Star 5	I. Block 6 in Corner

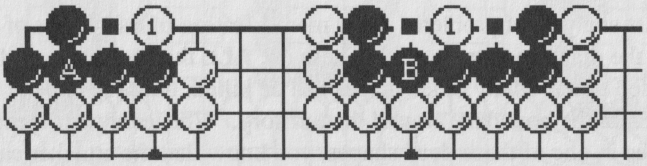
Focus only on real eyes.
Examine his territory and locate all places where a real eye could be formed. Then you can focus on what move to play first to split, eat or fill. You don't want to waste effort on false eyes or eyes that have been eaten already.

In the diagram below, all marked intersections are Black's territory, including the two White stones. But there is no point in considering the white-marked intersections. They are either false eyes, or points which have been eaten already by an adjacent White stone. Stones cannot eat each other. But a stone on a false eye point can eat an adjacent stone. If there had been three White stones (e.g., one on the empty adjacent White mark) then the third would still have been a potential eye.



Rule 2: Eat outside
Whenever his territory is not completely sealed, you have an opportunity to eat from outside. Eating outside of his territory is almost always preferable to eating from within his territory. An outside move cannot be a possible eye for him, but an inside move can be. Also, outside moves are profitable to you, even if you don't kill him. Inside moves that fail are often profitable to your opponent.

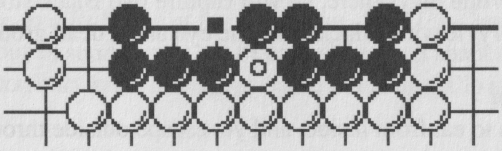
In diagram A below, Black had a potential eye at the black box, but W1 was played from outside next to it and now Black has no place to build two eyes.



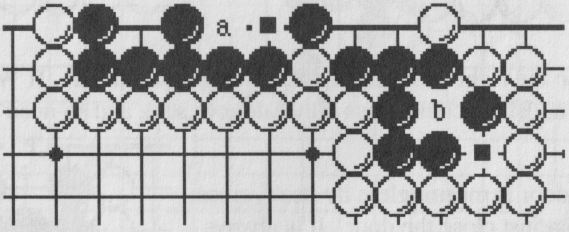
In diagram B above, Black had three places he could build an eye. W1 was played inside to destroy two of them. It does not destroy itself, so Black could try to capture it to make an eye. But one eye is not enough to live. If you imagine that each of the two Black groups had a second eye somewhere else, then in A, W1 would have cost Black one point of territory even while failing to kill. In B, however, W1 would become a prisoner of Black's, a gift of one point.

Rule 3: Attack the Crack

Black has two territories in the diagram below. The two-point territory is bounded by two strings, with the connection point marked with a black box. The two-point territory contains one potential real eye, and one already false eye (made false by White's marked stone). If White plays on the black mark, he eats the potential eye, but pays no price, since the best Black can get in return is a false eye. In this simple case, it's not a question of choice; it's the only eating move.

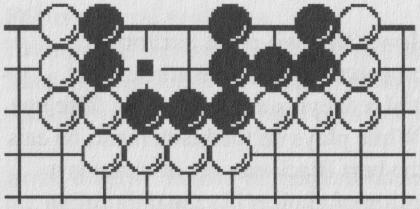


In the problem below, Black has one eye already, and two potential eyes (a, b). White is considering play on the two boxed intersections. b is destroyed via *Make him fill.*. a is destroyed by *Attack the Crack*. Attacking the a potential eye first is correct because the move to do so, in the crack between two black strings, threatens to capture one of them. If Black does not reply, he is captured and split apart. Crack moves which threaten immediate capture are such a strong reflex among experienced players that many play them immediately, *even when the group cannot be killed!*



Rule 4: Eat the wall

If the territory is bounded by multiple strings, maybe you can capture one of them. This removes an entire wall from around his territory, and is devastating. Obviously, to succeed, you will have to play any connection points quickly, lest he connect himself to his other strings. Eating his wall makes the inside become outside. This is great, because even if you don't kill the group you get something significant anyway. Needless to say, it's usually hard to succeed.



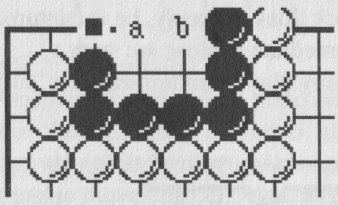
In the diagram at left, Black has two territories and two strings. The connection point is marked with a black box. If Black plays there, he loses one point of territory, but has easy life.

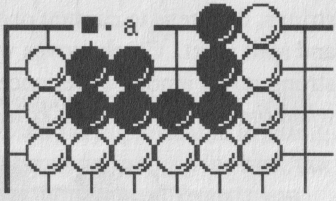
Somehow he failed to do so, leaving a huge opportunity for White in the diagram above. If White plays there, he will capture two Black stones, and eat four points of territory, leaving Black with one eye and a dead group.

Rule 5: Eat and run

Another neat trick is to eat from inside, and yet escape outside through an open door, a single-skip linkage boundary between a stone and the edge.

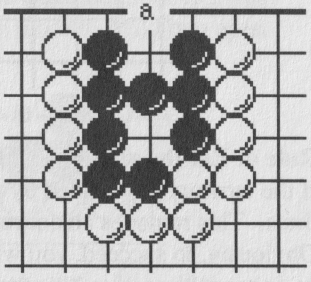
In the diagram on the left below, the door is a black mark. White will consider plays at a or b, intending to escape by playing her next move on the door if Black fails to close it. This would link her first move outside, keeping it safe.





The diagram on the right above has two doors (the box and a). If White went farther in than a,, Black could close either door to seal, and so need not rush.

Threatening a door is meaningless by itself, since the defender can just close the door. It is always used in conjunction with something else. In the diagram on the right, White can play a as a dual door threat, and thus Eat and Run with impunity.



Conflict?

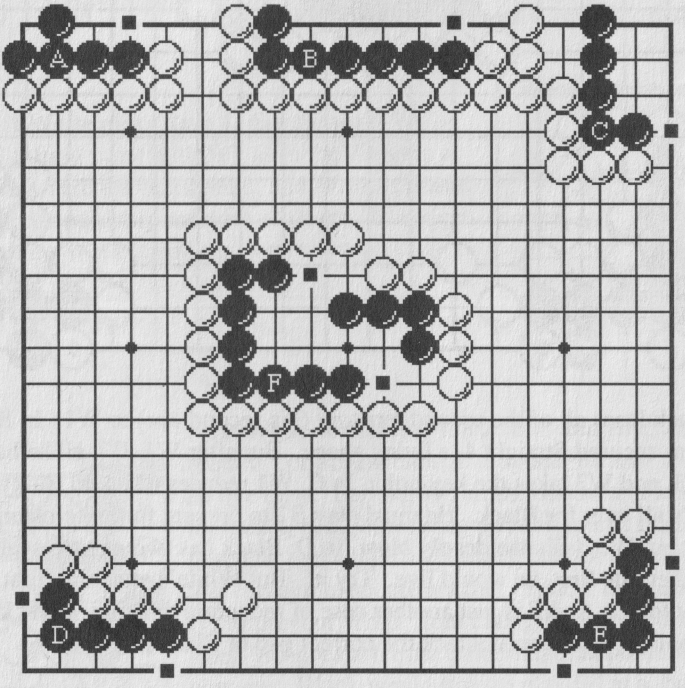
If you are sharp, you will realize there is potential for conflict between Eat outside and Eat his heart out. When his territory is not solidly bounded, you might be able to do both. Which do you do first? Almost always Eat outside first. But that's what the ability to look ahead is for. If you haven't the ability yet, stick with Eat outside and just play it.

Complexities of Life and Death

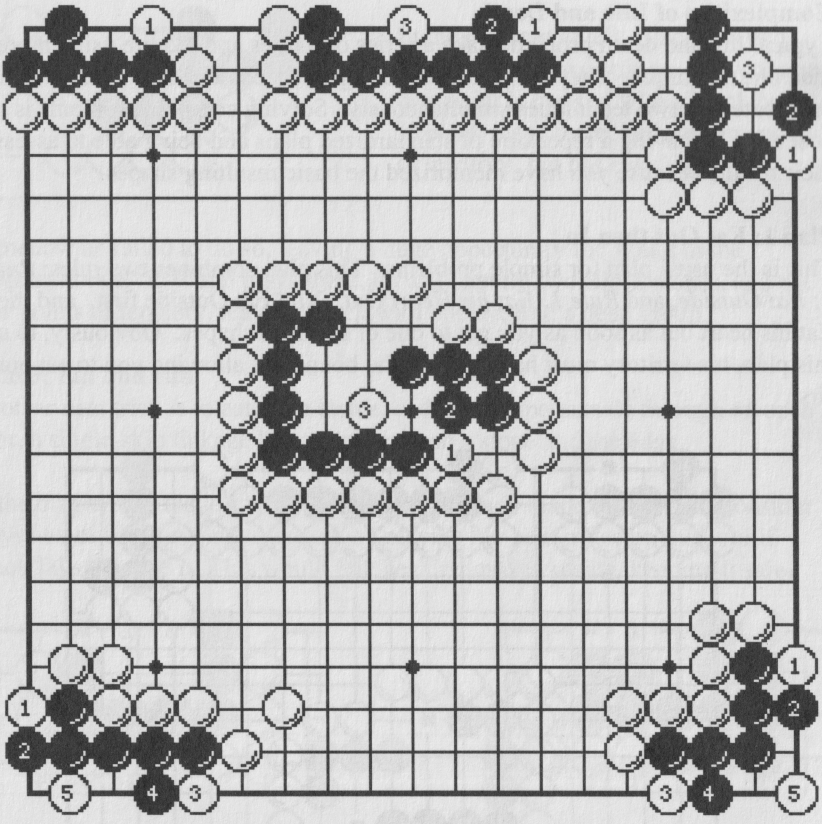
Typical life and death problems take a series of moves and require using more than one technique. They involve either using one technique and then another, or threatening two techniques simultaneously. Solving complex problems is best done by having a repertoire of standardized plans and being able to assess their results because you have memorized the basic resulting shapes.

Plan 1: Eat Out then In

This is the usual plan for simple problems. This plan combines two rules: *Rule 2: Eat Outside*, and *Rule 1: Eat his Heart Out*. You Eat Outside first, and then Eat his heart out as soon as you get to one of the dead shapes. Obviously, to use this plan, his territory must have gaps in the boundary, allowing you to eat out first.



Each Black group (above) has gaps in its territory (marked with black boxes). If Black occupied them he would be alive. If White takes one or more of them, Black loses one or two points of territory and dies.

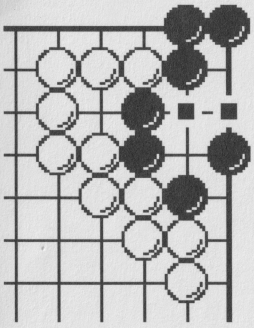


In A, Black loses all of the second territory (his second eye) to W1. In B, Black almost has secured Straight 4, a living shape. But after W1, B2, all he has is Straight 3, and W3 takes the key point. In C, W1 reduces Black to Bulky 5, after which it's all over for Black. He must play B2 to prevent further erosion of his territory, but W3 deals the deadly blow. In D, Black has two gaps to seal. If he got to either one first, he would live. Try it. But White's attacking first is fatal. Similarly for E. And F is just another case of reduction to Bulky 5 and kill on the key point. (White must attack the correct gap or Black lives!)

The only concern White might have is for the fate of stones threatened with capture, like W1 in D. White should not be too concerned. Black's capture of such a stone generates only a false eye (White controls a diagonal offset from the new edge-based eye). So long as White does not let Black escape out, everything is all right.

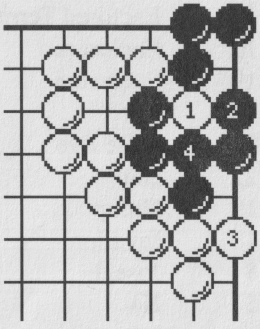
Plan 2: Eat your Fill

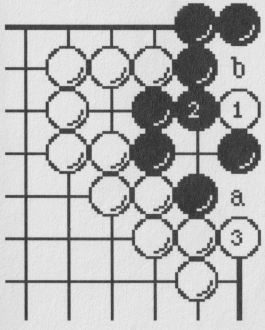
Actually, it's eat and fill, but it doesn't sound as good. This plan combines: *Rule 1: Eat his Heart Out*, and *Item 3: Make Him Fill (Fundamentals of Killing)*. Your job is to place a combined eating and filling move.



The diagram at left is an interesting example. Black has a bent four shape (but not in a corner), so if the boundary were solid, he would be alive. But the boundary has defects, so there's hope. Since Black has one large territory with no gaps, the first idea to consider is *Eat his heart out.*. White must play in the territory's center on one of the two black boxes. We know that merely trying *Eat his heart out* alone is doomed to failure, since the territory is not a dead shape. Perhaps some combination plan is suitable.

At right, if White picks *Rule 4: Eat the wall*, White takes the cutting point with W1 as in the diagram at right. Black take the other point, and White's plan to kill a boundary quickly runs out of steam. Black can easily capture White's cutting stone to stay connected.





Next White considers *Plan 2: Eat your fill.* That will require controling enough diagonal offsets to make an eye false. Playing W1 in the diagram at left is just the ticket, being the eating point diagonal from a potential eye where we already control one diagonal and can aim to secure another. Black, of course, plays B2 to prevent White from eating his only other eye. Then W3 goes after the other diagonal point of the new eye. Black would love to play B4 at a, but the presence of W1 makes such a play unsafe. If Black goes back to capture W1 with a play at b, White gets to play a. Black's second eye becomes false. Black is dead and gives up hope.

Conclusion

There are lots of other tricks to learn, but they all boil down to being variations on the same theme: *Split him, Eat him, Make him fill.*

Glossary

Page	Term
13	Attacked Linkage
16	Best Liberty
4	Capture
18	Contact Fight
20	Dead Group (Death)
28	Dead Shape
23	Dead Stones
22	Defect
32	Door
21	Double Ko
19	Edge Squeeze
10	Enclosed Territory
15	Enclosure
19	Extension
20	Eye
26	False Eye
22	Gap
10	Group
18	Invasion
8	Joseki
5	Ko
4	Liberty
9	Linkage
20	Living Group (Life)
10	Path (Linkage) Point
11	Position
11	Potential Territory
19	Running
13,16	Safe base
10	Sector Line
20	Seki
18	Squeeze
4	String
4	Suicide
13	Threatened Linkage